



ACHIEVEMENT IN SCIENCE AND MATHEMATICS OF SENIOR SECONDARY SCHOOL STUDENTS IN RELATION TO EXPOSURE TO INFORMATION AND COMMUNICATION TECHNOLOGY

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ABSTRACT

The study was under taken to investigate the relationship between achievement in Science and Mathematics with exposure to information and communication technology. The study was conducted on 200 students studying in 10+1 class in Government schools of Ludhiana District of Punjab (India). Marks obtained by the students in Science and Mathematics in their matriculation examination were taken as achievement in Science and Mathematics. Questionnaire prepared by investigator was used to collect data of exposure to use of information and communication technology. Results of the study revealed significant positive relationship of achievement in Science and Mathematics with exposure to information and communication technology.

KEY WORDS: Achievement in Science, Achievement in Mathematics, Exposure to information and communication technology, Senior Secondary School Students.

Introduction

The priority of most of the developing countries is to improve the quality of education at various levels as education plays a great role in all round development of any country. Such improvements could lead to improvement in productivity and will help to boost long-term economic development. To improve the education it is very important to adopt latest techniques as well as technology to enhance the learning as well as knowledge of the learners.

We must recognize that young generation is now an online population and access through a variety of means such as computers, Tele Vision and mobile phones. Digital literacy, the effective and creative use of ICT, is the key to developing skills for learning, life and work needed by young people in the modern world. Over the past few years, due to improvements in computer and technology ICT has become cheaper and more advanced. Parents believe that using computers and internet may increase their children's academic achievement therefore they buy computers with an internet connection to help their children succeed in school. In these days computer revolution provides cheaper and better home computers that allow students to revise what they have learned at school. Children are not only exposed to technology at home but also at school by new information and communications technologies (ICT). ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. It can influence the way students are taught and how they learn as now the processes are learner driven and not by teachers. This in turn would better prepare the learners for lifelong learning as well as to improve the quality of learning. In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs (Moore & Kearsley, 1996). Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to practice (Berge, 1998; Barron, 1998). ICTs also allow for the creation of digital resources like digital libraries where the students, teachers and professionals can access research material and course material from any place at any time (Bhattacharya & Sharma, 2007)

Schools must find new ways of thinking about how to use ICT so that it is at the heart of teaching and learning - not using computers to do the same things more efficiently, but changing the process of learning through digital media itself.

Information and Communication Technology

Information and communication Technology plays an overbearing role in almost every part of our lives. The world has become a global village due to the extensive use of Information Technology. The government and business have become so dependent on IT that it is difficult to envision how they would perform their functions without it.

ICT includes technologies such as desktop and laptop computers, software, peripherals and connections to the Internet that are intended to fulfill information processing and communications functions (Statistics Canada, 2008). ICT permeates the business environment, it underpins the success of modern corporations, and it provides governments with an efficient infrastructure. At the same time, ICT adds value to the processes of learning, and in the organization and management of learning institutions. The Internet is a driving force for much development and innovation in both developed and developing countries (UNESCO, 2002).

The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD ROMs etc have been used in education for different purposes (Sharma, 2003; Sanyal, 2001; Bhattacharya & Sharma, 2007). Innovative use of Information and Communication Technology can potentially solve this problem. Internet usage in home and work place has grown exponentially. ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. It can be used as a tool to overcome the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and distance barriers (McGorry, 2002).

From the above definitions it can be concluded that information and communication technology plays an important role in various fields of our life. It includes various types of products such as desktops, computers, laptops, smart phones and soft wares and internet connection as well. These various types of products helps in the process of learning. Internet as a product of ICT provides an innovative use of ICT and helps to remove barriers that are causing problems in the process of learning in education.

Achievement

Achievement is one of the most important goals of education. It is success or expertise of performance in a given skill. Achievement means the extent to which learning from instruction in a given area of learning. It is the amount of knowledge gained by the student to work hard and learn more, it also helps the teacher to know whether their teaching methods are effective or not and helps them in bringing improvements accordingly.

At its best, academic achievement represents intellectual growth and the ability to participate in the production of knowledge. At its worst, academic achievement represents inculcation and mindless introduction of the young into the canons and orthodoxy of the old (Landson, 1999).

Achievement is a thing that somebody has done successfully; especially using his/her own efforts and skills (Oxford Advanced Learner's Dictionary, 2000). Academic achievement may be defined as excellence in all academic disciplines, in class as well as co-curricular activities. It includes excellence in sporting behavior, confidence, communication skills, punctuality, arts, culture and the like which can be achieved only when an individual is well adjusted (Ganai & Mir, 2013). Academic achievement is the knowledge attaining ability or degree of competence in school tasks usually measured by standardized tests and expressed in a grade or units based on pupils' performance (Trow, 1956). Academic achievement is the knowledge obtained or skills developed in the school subjects usually designed by test scores or marks assigned by the teacher (Good, 1959). Academic achievement is the maximum performance in all activities at school after a period of training (Mishra, 2012). Academic achievement is the attainment of knowledge, competencies, and higher-level status, as reflected in grades, degrees, and other forms of certification or public acknowledgement (Collins, & O'Brien, 2011).

From the above definitions, it may be concluded the achievement is the core of wider term 'educational growth' and perhaps none would deny the importance of academics in child's life. The success or failure of a student is measure in terms of achievement. It is the amount of knowledge gained by students from instructions

in a given area of learning, which can be used in production of new knowledge and development of new skills in school subjects.

Review of related literature

• Computer use and academic achievement

Olanrewaju, Better, and Ngozi (2016), Huang (2008), Ravitz, Mergendoller and Rush (2002), and Worthen, Van Dusen, and Sailor (1994) found positive relationship between academic achievement and exposure to information and communication technology.

• Exposure to Information Technology and Achievement in Science and Mathematics

Kulkarni, Vishnupanth, and Dakshinamurthy (2013), and Delen and Bulut (2011) found significant positive effect of Information and Communication Technology on achievement in Science.

Soliman and Hilal (2016), Sharma (2013), Kumud and Lata (2013), Delen and Bulut (2011), Carrillo, Onofa, and Ponce (2010), and Jenkins (2005) found significant positive effect of Information and Communication Technology on achievement in Mathematics.

Zhang and Liu (2016) on the other hand found that different type of ICT use in Science and Mathematics had negative effect on achievement of these subjects in long term.

Emergence of the problem:

The review of related literature revealed that most of the studies on the proposed studies were found conducted in other countries (Soliman & Hilal, 2016; Olanrewaju, Better, & Ngozi, 2016; Zhang & Liu, 2016; Delen, & Bulut, 2011; Carrillo, Onofa, & Ponce, 2010; Huang, 2008; Jenkins, 2005; Ravitz, Mergendoller, & Rush, 2002; and Worthen, Van Dusen, & Sailor, 1994). Two studies were found conducted on Indian population, Kulkarni, Vishnupanth, and Dakshinamurthy (2013) in Goa and Sharma (2013), and Kumud and Lata (2013) in Haryana. No study was found conducted on population of Government School Students of Ludhiana district of Punjab, India on the proposed topic. So the proposed study seems fully justified.

Operational definitions of the terms used in the study

Achievement in Science: Achievement in Science in the present study is taken as marks obtained by the students in matriculation examination in the subject of Science.

Achievement in Mathematics: Achievement in Mathematics in the present study is taken as marks obtained by the students in matriculation examination in the subject of Mathematics.

Exposure to Information and communication technology: In the present study exposure to information and communication Technologies (ICT) is taken as the student having their own computer with internet/smart phone and is familiar with its use in their learning process.

Objectives

1. To investigate the significance of relationship between achievement in Science of senior secondary school students and exposure to information and communication technology.
2. To investigate the significance of relationship between achievement in Mathematics of senior secondary school students and exposure to information and communication technology.

Hypotheses

H₀1 There is no significant relationship between achievement in Science of senior secondary school students and exposure to information and communication technology.

H₂2 No significance of relationship exists between achievement in Mathematics of senior secondary school students and exposure to information and communication technology.

Method

Descriptive survey method was used in the present study.

Sample

The sample was picked up from various schools of Ludhiana District. In first stage five Senior Secondary schools were selected randomly from the list of Senior Secondary schools of Ludhiana district of Punjab (India). In the next step 200 students studying in 10+1 class in Government schools of Ludhiana District selected randomly.

Tools

1. Marks obtained in Science in matriculation examination.
2. Marks obtained in Mathematics in matriculation examination.

3. Questionnaire regarding exposure to use of information and communication technology prepared by the investigator (2016).

Result and Discussion

Karl Pearson's coefficient of correlation was calculated to investigate the relationship between Achievement in Science and Exposure to information and communication technology and the value is given in table 1 below:

Table 1 Relationship between achievement in Science and exposure to information and technology

Variables	N	r
Achievement in Science	200	0.25*
Exposure to information and communication technology	200	

*Significant at 0.01 level of significance

Table 1 reveals that the value of correlation between achievement in Science and exposure to information and technology is 0.25. This value is positive and significant ($p < 0.01$). Therefore, it can be concluded that Exposure to information and communication technology has significant positive relationship with Achievement in Science. Thus hypothesis H01 which states that 'there is no significant relationship between achievement in Science of senior secondary school students and exposure to information and communication technology,' is rejected. This finding is well supported by the studies conducted by Olanrewaju, et al (2016), Kulkarni, et al (2013), and Delen and Bulut (2011).

Karl Pearson's coefficient of correlation was calculated to investigate the relationship between Achievement in Mathematics and Exposure to information and communication technology and the value is given in table 1 below:

Table 2 Relationship between achievement in Mathematics and exposure to information and technology

Variables	N	r
Achievement in Mathematics	200	0.27*
Exposure to information and communication technology	200	

*Significant at 0.01 level of significance

Table 2 reveals that the value of correlation between achievement in Mathematics and exposure to information and technology is 0.27. This value is positive and significant ($p < 0.01$). Therefore, it can be concluded that Exposure to information and communication technology has significant positive relationship with Achievement in Mathematics among students. Thus hypothesis H02 which states that 'there is no significant relationship between achievement in Mathematics of senior secondary school students and exposure to information and communication technology,' is rejected. This finding is well supported by the studies conducted by Soliman and Hilal (2016), Sharma (2013), Kumud and Lata (2013), Delen and Bulut (2011), Carrillo, Onofa, and Ponce (2010), and Jenkins (2005).

Implications: Results of the study reveals significant positive relationship of the achievement in Science and Mathematics with Exposure to information and communication technology. It is thus suggested to the policy makers to provide exposure to information and communication technology in Government Schools of Punjab. All the Government Schools must have facility of computer with internet and Classrooms must be equipped with LCD projectors. Students can be allowed to use smart phone under the monitoring of parents and teachers. Teachers must guide the students about using information and communication technology in their self-study. They have to be familiarized with the appropriate websites related to teaching learning process.

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